

1. Record Nr.	UNINA9910300407303321
Autore	Bittihn Philip
Titolo	Complex Structure and Dynamics of the Heart // by Philip Bittihn
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2015
ISBN	3-319-12232-0
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (214 p.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	530 530.1 571.4 616.12
Soggetti	Biophysics Biological physics Statistical physics Cardiology Physics Biological and Medical Physics, Biophysics Applications of Nonlinear Dynamics and Chaos Theory Numerical and Computational Physics, Simulation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Introduction -- Methods -- Results -- Conclusion -- Appendix A Modeling Details -- Appendix B Supplementary Data -- Appendix C MediaSim -- An Open Framework for Simulating Extended Systems -- Index.
Sommario/riassunto	This award-winning thesis investigates the mechanisms underlying cardiac arrhythmia development and termination from an entirely new perspective. By viewing the heart as a complex system, the author uses theoretical tools from nonlinear dynamics combined with numerical simulations and experiments to achieve insights into the relationship between its structure and dynamics, thereby paving the way towards innovative low-energy defibrillation strategies. The work tackles,

among other things: the effect of substrate heterogeneity on the spatial-temporal dynamics of cardiac arrhythmias and ways in which weak pulsed electric fields can be used to control these dynamics in heterogeneous cardiac tissue. The long-term vision of this research is to replace the current strategy of applying painful and sometimes tissue damaging electric shock – currently the only reliable way to terminate life-threatening fibrillation – by a more subtle but equally effective intervention. The book maps out a number of promising research directions for biophysicists and medical researchers working on the origins and treatment of cardiac arrhythmias.
